Sample Paper 10

ANSWER KEYS																			
1	(b)	**7**	(b)	**13**	(d)	**19**	(b)	**25**	(c)	**31**	(d)	**37**	(d)	**43**	(d)	**49**	(d)	**55**	(a)
2	(b)	**8**	(d)	**14**	(d)	**20**	(a)	**26**	(b)	**32**	(d)	**38**	(a)	**44**	(b)	**50**	(c)	**56**	(c)
3	(a)	**9**	(c)	**15**	(d)	**21**	(a)	**27**	(a)	**33**	(d)	**39**	(a)	**45**	(a)	**51**	(a)	**57**	(b)
4	(b)	**10**	(c)	**16**	(b)	**22**	(a)	**28**	(c)	**34**	(b)	**40**	(c)	**46**	(a)	**52**	(d)	**58**	(c)
5	(a)	**11**	(b)	**17**	(c)	**23**	(a)	**29**	(a)	**35**	(d)	**41**	(a)	**47**	(c)	**53**	(b)	**59**	(a)
6	(a)	**12**	(a)	**18**	(a)	**24**	(a)	**30**	(d)	**36**	(a)	**42**	(a)	**48**	(a)	**54**	(b)	**60**	(c)

SOLUTIONS

1. (b) 2. (b) 3. (a) 4. (b) 5. (a)

6. (a) The seminal vesicles are involved in producing the seminal fluid. One of the components of the seminal fluid is an energy source for the sperm in the form of fructose.

7. (b)

8. (d) The placenta is a type of endocrine gland during the period of pregnancy. It produces hormones like human chorionic gonadotropin (hCG), human placental lactogen (hPL), estrogen and progesterone.

9. (c) 10. (c)

11. (b) Megaspore mother cell (2n) undergoes reduction division to form 4 haploid (n) megaspores by the process called megasporogenesis.

12. (a) According to principle of dominance, out of the two factors of alleles representing different traits of a character, only one expresses itself. But when both express themselves it is codominance.

13. (d) Given that both parents are true-breeding, the cross must be either $AA \times AA$, $AA \times aa$, or $aa \times aa$. If you work out these crosses, you will see that all of the possible answers are true for each possible situation.

14. (d) 50% of ova will have (n + 1) chromosome which would, on fertilisation, yield abnormal zygotes (n + 1) + (n) = 2n + 1.

15. (d) Haemophilia is an X-linked trait, and can only be inherited by the son from his mother's X chromosome. The father contributes the Y chromosome to his son (not his X chromosome) and thus cannot pass any of his X-linked alleles to his son.

16. (b) 17. (c)

18. (a) According to the Wobble hypothesis, tRNA anticodon has the ability to wobble at its 5 end by pairing with even non-complementary base of mRNA codon. It corresponds to third base degeneracy of the codons.

19. (b)

20. (a) For the integrity of DNA to be maintained, repair mechanisms must be active during synthesis, modification, and utilization of DNA.

21. (a) DNA polymerase adds nucleotides to an existing nucleotide strand.

22. (a) DNA fingerprinting is the technique of determining nucleotide sequences of certain areas of DNA which are unique to each individual. DNA contains non cistronic hypervariable repeat sequences called VNTR. DNA fingerprinting involves the identification of these VNTRs.

23. (a)

24. (a) DNA fragments are negatively charged because of presence of phosphate group.

25. (c) Assertion is true but Reason is false.
MTPs are considered relatively safe during the first trimester i.e., upto 12 weeks of pregnancy. Second trimester abortions are much more risky.

26. (b) Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
A combined pill is the most commonly used birth control pill. It contains synthetic progestrone and oestrogen in doses high enough to check ovulation.

27. (a) Both Assertion and Reason are true, Reason is the correct explanation of Assertion.
The male urethra is lined by pseudostratified epithelium.

28. (c) Assertion is correct but Reason is incorrect.
Sickle cell anaemia is a classic example of point mutation.

29. (a) Label B

30. (d) Spermatogonium is diploid and contains 46 chromosomes. Some of the spermatogonia called primary spermatocytes periodically undergo meiosis. A primary spermatocyte completes the first meiotic division (reduction division) leading to formation of two equal, haploid cells called secondary spermatocytes, which have only 23 chromosomes each. The secondary spermatocytes undergo

second meiotic division to produce four equal, haploid spermatids. Thus each secondary spermatocyte produce two haploid spermatids. The spermatids are transformed into spermatozoa (sperms) by the process called spermiogenesis.

31. **(d)** **32.** **(d)**

33. **(d)** In Intra-Uterine Transfer (IUT) embryo with more than 8-blastomeres stage (morula) is used for transfer into the uterus.

34. **(b)** The birth control pill interferes with the maturation of the follicles and the ova, inhibiting release of an egg.

35. **(d)**

36. **(a)** If the mother has blood group I^AI^A and the father has blood group I^BI^O, then their children can only have genotypes I^AI^B or I^AI^O, which have the phenotypes blood group AB and blood group A respectively.

37. **(d)** Down's syndrome is caused by the presence of an extra chromosome number 21 and the offspring has 47 chromosomes.

38. **(a)**

39. **(a)** Pedigree analysis is a record of the occurrence of a trait in several generations of a human family. In this\ male members are shown by squares and female by circles. Siblings are represented horizontally on a line in order of birth. It helps us in giving information about genotype of an individual for trait under investigation.

40. **(c)** Woman acts as a carrier. Both son & daughter inherit X-chromosome. Although only son would be the diseased one.

$$X^cX \times XY$$
$$\downarrow$$
$$X^cX \;\; X^cY \;\; XX \;\; XY$$

41. **(a)**

Parents – TT (Tall) × (tt) Dwarf

F_1 generation It (Heterozygous Tall)

On Selfing

Pollen	→	T	t
T		TT	Tt
		Tall	Dwarf
t		Tt	tt
		Tall	Dwarf

Phenotypic ratio : 3: 1 (Tall :Dwarf)

Genotypic Ratio: 1:2:1 (Homozygous Tall : Heterozygous Tall : Dwarf)

42. **(a)** The number of base pairs (bp) found in the haploid genome of humans is 2.9×10^9.

43. **(d)** Splicing is the removal of introns and joining the exons in a defined order in a transcription unit. In molecular biology, splicing is a modification of RNA after transcription, in which introns are removed and exons are joined.

44. **(b)** The complementary base will pair with each base on the template to form the specific sequence shown.

45. **(a)** Test cross is the cross of an individual with an individual having recessive phenotype. It is used to determine the genotype of a plant showing the dominant phenotype, that means to determine whether the individual exhibiting dominating characters are homozygous or heterozygous.

46. **(a)** DNA polymerase cannot initiate the building of a nucleotide strand; it can only add to an existing strand. Thus, RNA primers are necessary to begin DNA synthesis.

47. **(c)** **48.** **(a)** **49.** **(d)** **50.** **(c)** **51.** **(a)** **52.** **(d)**

53. **(b)**

54. **(b)** Commelina

55. **(a)** **56.** **(c)**

57. **(b)** Condoms are barriers made of thin rubber/ latex sheath that are used to cover the penis in the male or vagina and cervix in the female.

58. **(c)**

59. **(a)** The structure marked as X is rete testis. The rete testis is an anastomosing network of delicate tubules located in the hilum of the testicle (mediastinum testis) that carries sperm from the seminiferous tubules to the efferent ducts.

60. **(c)** The given figure shows the role of ovarian hormones and growth of ovarian follicles in the various phases of menstrual cycle.